

On December 29 two tails were shown, one of which was made up of four distinct streamers with nebulous matter between them; two of these streamers were crossed so as to present a twisted appearance, whilst the two outside ones diverged in the usual manner. On no two negatives are the images the same, the day-to-day development being very marked. Between January 3 and 4 there was a decided change in the position-angle of the extremity of the tail, which is shown in a striking manner by the superposition of the two oriented images, and is somewhat similar to that recorded by Prof. Barnard in the case of Brooks's comet 1893 iv.

THE RED SPOT ON JUPITER, 1905-6.—The results of Mr. Stanley Williams's observations of the Great Red Spot during the opposition of 1905-6 appear in No. 4150 of the *Astronomische Nachrichten*. The transit times of the spot were all observed by simple eye estimates, care being taken to avoid looking at the Red Spot Hollow, which, as compared with the spot itself, was a very conspicuous feature. The rotation period, as determined from 635 rotations, was found to be 9h. 55m. 41.46s., a value slightly less than that determined from the 1904-5 opposition. The mass of dark material, which circles round the belt in which the spot is situated, overtook the spot during the last week in March, 1906.

Micrometer measures made during the period November, 1905, to February, 1906, showed the mean longitude of the Red Spot Hollow to be $29^{\circ}.41$, a position some $1^{\circ}.3$ following the spot itself. Mr. Williams discusses the relative accuracy of the micrometer method at some length, and, from his experience, arrives at the conclusion that it is likely to introduce errors due to the alteration of the appearance of the observed feature caused by the superposition of the micrometer wires a conclusion which is confirmed by other observers of Jovian phenomena.

A PECULIAR SHORT-PERIOD VARIABLE (155.1906 CASSIOPEÆ).—From a number of observations made at Potsdam during 1906, Messrs. Müller and Kempf find that the sixth-magnitude star B.D.-68° 200 is a variable, with a period of 1.95 days and a remarkably small range of light variation, the whole amplitude amounting to only 0.33 magnitude (*Astronomische Nachrichten*, No. 4148).

THE BRITISH SCIENCE GUILD.

THE first annual meeting of the British Science Guild was held at the Mansion House on Monday, January 28. Just fifteen months have passed since the inauguration of the Guild in October, 1905, and the very large gathering of sympathisers with the new movement was eloquent of the fact that the hopes and confident expectations of its organisers have not been disappointed. The Lord Mayor, Sir W. Treloar, presided, and was supported by the president, the Right Hon. R. B. Haldane, and Sir Norman Lockyer, the chairman of committees. Many eminent representatives of science, industry, and the educational world were present.

The Lord Mayor having opened the meeting by offering a warm welcome to the Guild, Sir Norman Lockyer gave an outline of work accomplished since its inception, touching on the main points mentioned in the report, of which the following is an abstract. The first part was purely historical. It stated what the committees have done. Though their activities have not figured so prominently before the general public outside, it must be remembered that the more important the work was going to be, the more quiet must it be in the first instance. The first public outcome of the Guild was connected with the report of the Departmental Committee appointed to consider the question raised by the proposed new Technological Institution at South Kensington, and the fear that the scheme might be delayed in consequence of certain differences of opinion as to the constitution of the governing body. The result was the letter to the *Times* last year, in which the Guild urged most strongly that neither the question of the ultimate and final relationship of the new institution

to London University nor any other matter should be allowed to interfere with the immediate appointment of at least an organising governing body.

The next important point to which the report refers was that of the grant to the National Physical Laboratory; it described the happy result of Mr. Haldane's interposition with the Treasury in obtaining an increase of the grant from 5000*l.* to 10,000*l.*

At the request of various bodies, the Guild has taken part in several important deputations. Sir John Cockburn represented the Guild on a deputation to the President of the Board of Trade urging the importance of the compulsory working of patents.

On account of certain changes contemplated by the Government, the council of the Royal Society of Edinburgh asked for the support of the Guild in the matter of obtaining suitable buildings to house the society, and also a suitable grant for yearly expenses. This support was most cordially given by the executive committee. The sum originally proposed to be expended by the Government on the new buildings was 14,000*l.*, but the final result of the action of a committee and of the representations made by the deputation, on which the Guild was represented by Sir W. Ramsay, K.C.B., was to secure for the society a sum of 25,000*l.* for the purchase of a building, 3000*l.* to cover the expenses of fitting it up, and a yearly grant not exceeding 600*l.* a year. The council of the Royal Society of Edinburgh has expressed the opinion that these arrangements are quite satisfactory (see p. 205).

Several communications were received from the officers of the Marine Biological Association urging the Guild to form part of a deputation to the Chancellor of the Exchequer on the subject of the continuation of the grant in aid of the International Fisheries' Investigations. Sir Michael Foster, K.C.B., was nominated to represent the Guild on the deputation, which, introduced by the Right Hon. Austen Chamberlain, M.P., was, in the unavoidable absence of the Chancellor of the Exchequer, received by the Parliamentary Secretary, Mr. McKenna, M.P., on December 18, 1906 (see p. 185).

In June the Guild received a communication from the anthropometric committee of the British Association, in relation to a deputation to the Prime Minister urging him to appoint a commission to carry out a periodic anthropometric survey of school children and adults. It is proposed that this commission shall be constituted on the same lines as the advisory council recommended by the Physical Deterioration Committee, and preferably should be under the direct control of the Prime Minister, like the Defence Committee. The proposed anthropometric survey would also be on the lines recommended by the Physical Deterioration Committee. The executive committee considers the proposed survey as a most important application of science to statecraft, and has nominated a representative of the Guild to attend the deputation which the Prime Minister has consented to receive after the recess.

The education committee has had before it a proposal to form two new committees, one dealing with elementary and secondary education, especially in relation to the introduction of leaving certificates from the primary school, and the importance of practical scientific training in both. It was proposed that the second educational committee should consider the question of an increased endowment of universities by the State. Referring to this committee, Sir Norman Lockyer remarked that the private endowment of American universities last year amounted to five millions sterling. It is hard for us as a nation to compete with that. Germany is strengthening its universities just as thoroughly as it is strengthening its Fleet, a reminder that we ought to be able to compete with other nations in the preparation and equipment for industrial progress, as well as for war.

The report recorded the overtures made to the Franco-British Exhibition Committee, as the outcome of which the exhibition committee's desire to include science in their programme was stated. The assistance of the Guild was asked in the formation of the science section, and it was now proposed that lectures should be given during the continuance of the exhibition by British and French men of science.

The progress of the Guild was indicated by the membership of 599, and by the fact that already branches are being formed in Canada and Australia.

Mr. Haldane then rose to move that the record of action summarised in the report be approved. He endeavoured, first, to answer a possible criticism of this record. Some might think that it was not startling or striking, and foretold no revolution to be effected. But the founders of the Guild never believed that progress could come rapidly. Nothing but strenuous labour in educating the public would bring home to the public mind the depth and reality of the conviction on which this British Guild of Science was based, that Knowledge was Power. Nevertheless, Mr. Haldane disavowed a pessimistic outlook. There was much that was encouraging. Go where they would, applied science was taught in a fashion in which it was never taught a few years ago, and he instanced three universities which he had himself recently visited—Glasgow, Manchester, and Liverpool; at Birmingham and London also the tendency was not less visible. We did not notice it, but it had been noticed by the Continent. "I have been struck more than once by the emphatic testimony given by Continental experts to the progress which has taken place in Great Britain, which is, they say, at the present time, relatively speaking, more rapid than the progress in other parts of the world. Well, we have much to make up. America has been ahead of us, and I do not think it is only endowment. I think it is the practical spirit of the American people which has made them realise how essential it is to a country which is leading the industrial world that the best science should be at the disposal of all the manufacturers. Canada herself is in some respects ahead of this country. There is a technical equipment in the McGill University, Montreal, the like of which we hardly know, and it is not contrary to what one likes to see that our own young men should be taking advantage of the opportunity which that University offers to go and get the highest training in some branches of applied science under the British flag."

Mr. Haldane attributed some good in this respect to the fiscal controversy. It was demonstrated that we had gone back, because we were using antiquated methods in competition with those who used new and more scientific methods. All this had stirred up many of our great captains of industry, and to-day brains had a better market than they had had for a very long time past in Great Britain. Reviewing all these things, Mr. Haldane thought they ought to make us hopeful. Scientific education was no longer at a discount. He directed attention to his own department of administration at the War Office, for this new movement was not confined merely to private industry; we train our young officers, he said, as they were never trained before, and we have an average of scientific attainment among our young officers such as has not been seen at any previous time in the British Army. Then he pointed out another thing which, he thought, lent itself to the objects of the Guild, and that was the extent to which the private employer is giving way to the joint-stock company. The joint-stock company had its disadvantages, but under it more and more the price of brain was the price which was paid to the manager, and less and less to the private capitalist. More and more science was thus levelling opportunity, and giving to everybody the chance of making himself a power among his fellow-men.

Mr. Haldane concluded his interesting speech with these words on the relation of the State to science:—"All this costs money, and, if the State is to play its part in it, it must cost the State money. Well, but the national income is increasing. These very things give a reward which is four-fold or ten-fold more than the expenditure necessary to earn it. There are those who put our national income somewhere between 1600 millions and 2000 millions at the present time. Well, our expenditure under the Imperial Government is well within 10 per cent., even if you take the lowest of those figures, and surely 10 per cent. is not much for a people to contribute to get advantages so enormous as we see on every side to-day. Education, improved surroundings, equality of opportunity to a degree we have never known before, increase of the national production—all these things are well worth purchasing at an

expenditure which means only a fraction of that 10 per cent., and I say that if the State only spends its money wisely the State will make no better investment for those for whom it is responsible than an adequate expense on the development of scientific method. Our problem is to awaken our country. There are many others engaged in that work. This Guild is only one of several organisations, but it contains on its roll perhaps more distinguished men of science than any other society which is engaged in a like work. Our business is to act in the true missionary spirit, and, acting in the true missionary spirit, we have to see to it that our energies do not flag and that we do not allow the sun to go down before our labours are complete."

The Hon. and Rev. E. Lyttelton, the headmaster of Eton College, followed Mr. Haldane. He had been astonished at the zeal shown by the committee, and his agreement with the previous speaker's hopefulness was shown by the remark:—"I have never yet taken part in any movement which seemed to me so absolutely certain to have a lasting and deep effect upon the life of the country than this one." He was greatly struck with the progress of the scientific spirit in the educational world. There was no subject now taught in schools in the same way as it was taught in schools thirty years ago. "If that has been done at a time when many schoolmasters have been vocal with indignation at the encroachment of science on their private domain, how much more will be done in the next thirty years, when we have grown wise enough to see that whatever be the blessings of a literary education, there is not the slightest reason why in every school there should not be a combination of literary education with scientific training." This much-agitated conflict between literature and science in university circles was commented on in a striking way by a later speaker—the Vice-Chancellor of Cambridge University, Dr. E. S. Roberts. The Vice-Chancellor of Oxford University was, unfortunately, unable to be present, but Dr. Roberts pointed out as a happy omen the fact that that gentleman, as well as Mr. Lyttelton and himself, were all representatives of literature, and yet were all very keen advocates of science.

Mr. Alfred Mosely offered some interesting remarks on the teaching of science in America, and Prof. Meldola took the opportunity of correcting a notion which existed in some quarters that the Guild was specially interested in the practical and industrial application of science. He wished to see the encouragement of scientific method as a cult. The work of the Guild, he hoped, would be to raise the level of public opinion towards abstract science itself. The rest would follow.

The other business resolutions included one to permit of distinguished Americans and foreigners being elected honorary members—an extension of the basis of the Guild due to the courtesies and offers of information from eminent Americans.

The following executive committee for the ensuing year was elected. The new members are indicated by italics:—*President*, Right Hon. R. B. Haldane, M.P., F.R.S.; *hon. treasurer*, Right Hon. Lord Avebury, F.R.S.; *hon. assistant treasurer*, Lady Lockyer; *trustees*, Sir James Blyth, Bart., Mr. C. W. Macara; *vice-presidents*, Sir Archibald Geikie, F.R.S., Sir John Wolfe-Barry, K.C.B., F.R.S.; *chairman of committees*, Sir Norman Lockyer, K.C.B., F.R.S.; *vice-chairmen of committees*, Sir William Ramsay, K.C.B., F.R.S., Sir Lauder Brunton, F.R.S., Hon. Sir John Cockburn, K.C.M.G., Sir Philip Magnus, M.P.; *hon. secretary*, Sir Alexander Pedler, C.I.E., F.R.S.; *members*, Sir Hugh Bell, Bart., Mr. G. T. Beilby, F.R.S., Right Hon. Thomas Burt, M.P., Mr. Dugald Clerk, Captain Creak, C.B., R.N., F.R.S., Dr. Francis Elgar, F.R.S., Prof. Meldola, F.R.S., Sir William Mather, Major-General Sir F. Maurice, K.C.B., Prof. J. Perry, F.R.S., Sir William White, K.C.B., F.R.S., Mr. Carmichael Thomas, Mr. F. Verney, M.P., Sir Henry Trueman Wood, Sir Edward Brabrook, C.B.

The following new vice-presidents were appointed:—Lord Reay, president of the British Academy; President Warren, Vice-Chancellor of the University of Oxford; the Vice-Chancellor of the University of Cambridge; Sir Frederick Pollock, Bart., and Sir David Gill, K.C.B., F.R.S.